Report [s]

HYDRO-ELECTRIC INQUIRY COMMISSION

REPORT
ON
SEVERN SYSTEM

W. D. GREGORY, CHAIRMAN
M. J. HANEY
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SERETARY

SEWER SYSTEM

COPY

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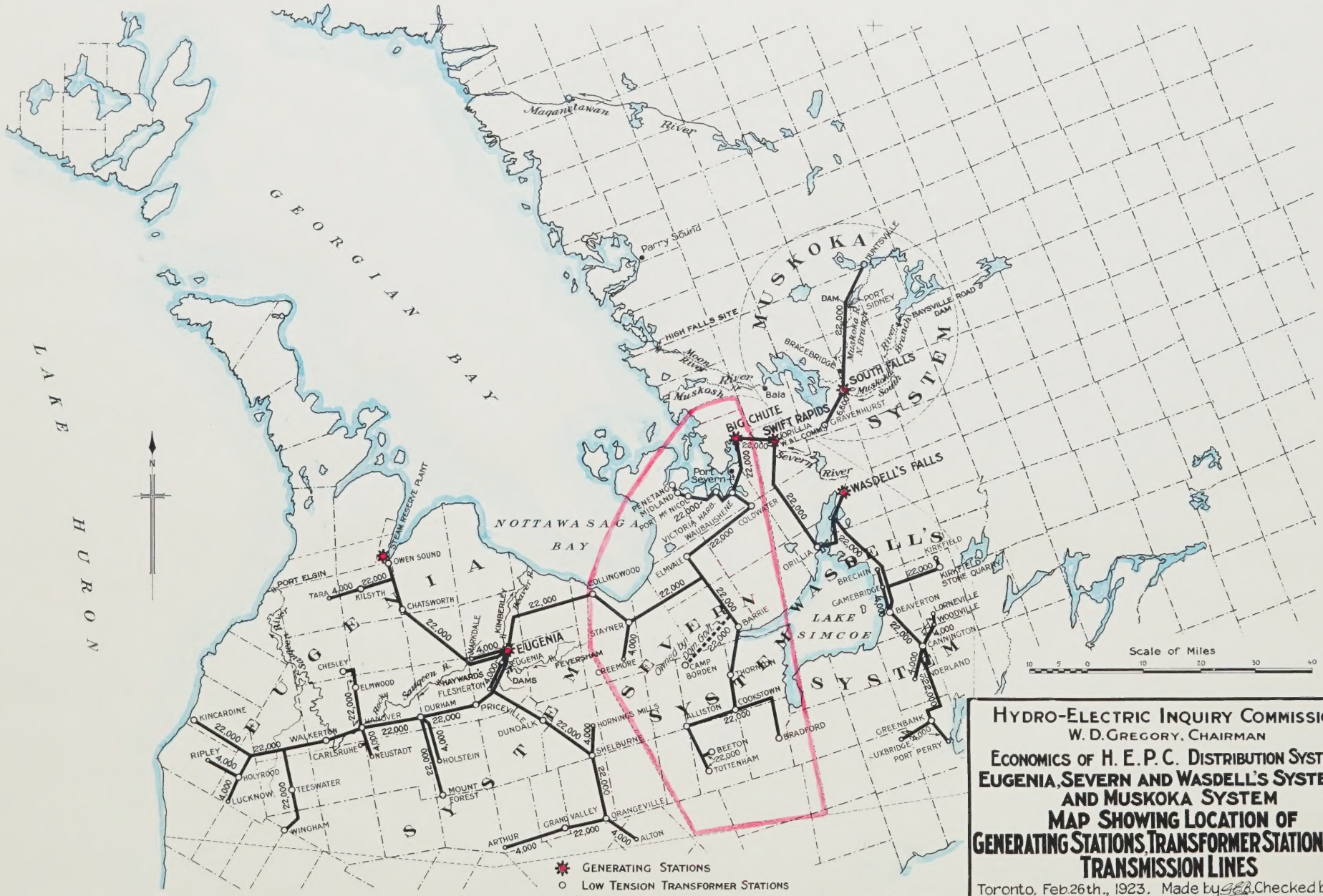

HYDRO-ELECTRIC INQUIRY COMMISSION
W. D. GREGORY, CHAIRMAN

ECONOMICS OF H. E. P. C. DISTRIBUTION SYSTEMS
EUGENIA, SEVERN AND WASDELL'S SYSTEMS, AND MUSKOKA SYSTEM

MAP SHOWING LOCATION OF GENERATING STATIONS, TRANSFORMER STATIONS AND TRANSMISSION LINES

Toronto, Feb. 26th., 1923. Made by [illegible] Checked by [illegible]

WALTER J. FRANCIS & COMPANY
CONSULTING ENGINEERS

Map Showing Location of

Generating Stations, Transformer Stations and Transmission

Lines of the

Eugenia, Severn, Wasdell's and Muskoka Systems.

The area outlined in red

shows the Severn System.

To His Honour Henry Cockshutt,

Lieutenant-Governor of the Province of Ontario.

May it Please Your Honour:-

The power development of the Hydro-Electric Power Commission of Ontario (hereinafter called "the Commission") known as the "Severn System" has, in accordance with the directions contained in your commission to us, been inquired into by us and we respectfully submit our report thereon. Accompanying our report are the reports of our Consulting Engineer, Mr. Walter J. Francis, on the Engineering Economics, and of our Accountants, Messrs. Price, Waterhouse and Company, on the Accounts of the System.

District Served by "Severn System".

The map, a copy of which prefaces this report, was prepared by Mr. Francis and shows the location of the generating stations, transformer stations and transmission lines of the Eugenia, Severn, Wasdell's and Muskoka Systems. The part of the Province served by Severn System is outlined in red on the copy of the map, is both rural and urban and includes the towns of Barrie, Stayner, Collingwood, Penetanguishene, Midland and Port McNicoll.

Historical Sketch

In September, 1909, the Simcoe Railway and Power Company of Midland secured a Crown lease permitting it to develop

Statement issued by "Hydro-Electric".

The map, a copy of which prefaces this report, was prepared by Mr. Cassidy and shows the location of the generating stations, transformer stations and transmission lines of the Ontario, Toronto, Hamilton and Niagara Power Co. The part of the Provincial system by Hydro Power is realized in fact so the map of the map, it will point out urban and industrial areas of Toronto, Oakville, Hamilton, Niagara Falls and Port Dalhousie.

Statistics Branch

In September, 1919, the Ontario Railway and Power Company of Ontario reserved a large issue pamphlet as to showing

power at the Big Chute on the Severn River to the full capacity of the site, the object being to transmit the power to the towns of Midland and Penetanguishene. The Big Chute generating station was built by this company and was put into service in 1911.

The Commission, in November, 1910, at the request of the municipalities concerned, made a survey and estimated the cost of power supply to Midland and Penetanguishene, and after the necessary by-laws were submitted and passed in January, 1911, made a contract with the Simcoe Railway and Power Company to purchase the power required for these two towns.

The contract called for an initial delivery of 200 horse-power and additional blocks of 50 horse-power until the total amount so reserved had reached 500 horse-power, then additional blocks of 100 horse-power each until the total amount so reserved reached 1500 horse-power. The price of power under the contract was:

200 horse-power -	$21.00	per horse-power per
500 horse-power -	$20.00	annum at 2200 volts;
1,000 horse-power -	$19.00	$1.00 less for all
1,500 horse-power -	$17.50	power at 22,000 volts.

The agreement was to remain in force for ten years and was renewable thereafter for two terms, one of five years, and the next terminating September 10th, 1929, the date upon which the company's lease with the Crown would have expired.

Having built the necessary transmission lines and distributing stations, the Commission began to supply power

power at the time the Tarbon Line to the Tell Ya-
pashir at the city, the entire union of Ilmanmit was taken by
the towns of Bilkhani and Constantinobono. The 31g Jhrts
generation station was built by this company and was put into
service in 1911.

The Commission, in November, 1910, at the request of
the municipalities concerned, made a survey for providing the
best of power supply to Ilkhani and Constantinobono, and after
the necessary by-laws were published and passed in January,
1911, made a contract with the Simone Railway and Power Company
to purchase the power required for these two towns.

The contract calls for an initial delivery of 320
horse-power and an additional 1000 of 50 horse-power until the
total amount is exhausted. In exchange for providing 400 horse-power, the
municipal income of the Tarbon-Jhrts will be paid
annually to the Simone Light and Power Company. The price of
power under the contract was

320 horse-power - $11,200 per horse-power per
100 horse-power - $20,000 annum or 1000 watts.
3,000 horse-power - $18,000 $14.00 less for all.
1,500 horse-power - $17,000 power at 22,000 watts.

The agreement was to remain in force for ten years
and was renewable thereafter for the term, are of five years,
and the same immediately thereafter life, the date upon
which the company's lease with the Crown which has expired.

During with the necessary transmission lines and
distributing transformers, the immediate model is supply power

in July, 1911.

By the end of the year 1913 the number of municipalities served with power purchased from the Big Chute plant had increased to seven, namely: Barrie, Coldwater, Collingwood, Elmvale, Midland, Penetanguishene, Stayner, and the power demand had more than doubled. At a meeting of the Commission held on March 24th, 1914, the purchase of the Big Chute plant was considered. As a result, on June 30th, 1914, the Commission purchased from the Simcoe Railway and Power Company, its power development together with its transmission lines and distributing stations. The Order-in-Council permitting the purchase was dated June 8th, 1914. It set the purchase price at $475,000.00.

Previous to the acquisition of the Big Chute plant the Commission had purchased all the power for the Severn System from the Simcoe Railway and Power Company from the Big Chute plant. Since the date of purchase the power required has been generated at the Big Chute plant and purchased from the Eugenia and Wasdell's Systems, and new agreements have been made with the municipal corporations interested, other than the Village of Victoria Harbour, which for some unknown reason was overlooked and with which the original contract still exists although the dealings between it and the Commission are not on the basis of the terms of the contract but on the assumption that a new contract had been

made, under which they assumed their proportion of the capital cost of the properties purchased.

In the latter part of 1916, a tie line between the power house at Eugenia and the Severn System lines at Collingwood was constructed, thus enabling the Commission to market the surplus power available at the Eugenia Development in the municipalities located in the Severn District.

In 1916 negotiations were carried on between the Town of Orillia and the Commission covering the sale of power from the Orillia-Swift Rapids Development, for use on the Severn System, and also covering the interchange of power between the Orillia System and the Commission's developments at Big Chute, Eugenia Falls and Wasdell's Falls.

A short term agreement was also entered into on August 15th, 1916, between the Water & Light Commission of the Town of Orillia, and the Commission covering the purchase by the town of 2,000 horse-power required for the use of munition plants in the municipality prior to the completion of the Swift Rapids Development. This agreement also provided for the joint use of transmission lines by both parties.

In 1917 negotiations were completed for the purchase from the Orillia Water & Light Commission of the seven and one-half miles of conductor extending from the Big Chute plant to a point approximately south of the Orillia Commission's power house at Swift Rapids, thus providing a

power, under which that economic right provisions of the
applied here at the primary convenience.

In the latter part of 1916, a tie line between the
power house at Niagara and the Queen Queen lines at
Dalhousie was constructed, thus tapping the Niagara at
marks the higher power available at the public development
in the municipalities located in the Queen District.

On like negotiations were carried on between the
Town of Orillia and the Toronto Power Co. for a supply of power
from the Orillia-Swift Rapids Development, for use on the
Severn System, and also covering the interchange of power be-
tween the Orillia System and the Commission's developments
on Big Chute, Musquash and Musquash's Falls.

A short term agreement was also entered into on
August 23rd, 1916, covering the sale of a light quantity of
the Town of Orillia, and the Commission covering the purchase
by the Town of 2,000 horse-power required for the use of
municipal plants in the municipality prior to the development
of the Swift Rapids Development. This agreement also con-
tained for the first time an arrangement fixed on by the parties.

In 1917 negotiations were completed for the purchase
from the Orillia Water & Light Commission of the Town and
one-half miles of conductor extending from the Big Chute
plant to a point approximately south of the Orillia Commis-
sion's power house at Swift Rapids, then paralleling a

permanent connection between the Big Chute and the Swift Rapids plants and completing the link between the Severn and Wasdell's Systems by the use of the Orillia Commission lines.

In 1917 an additional contract was executed between the Town of Orillia and the Commission covering a permanent supply of power from the Swift Rapids plant under construction by the town. The contract covered the paralleling of the Swift Rapids generating station with the generating stations located at the Big Chute, Wasdell's and Eugenia, the joint use of transmission lines and the supplying of emergency power by both parties.

A new agreement between the Town of Orillia and the Commission, covering the transfer of power from the Wasdell's System to the Big Chute Development by means of the Orillia transmission lines and generating station, for the purpose of utilizing the surplus power of the Wasdell's Development on the Severn System, became effective November 1st, 1918. This agreement also covered the purchase of surplus power from the Orillia System when same was required for serving the municipalities of the Severn System, as well as the paralleling of the Eugenia, Severn and Wasdell's Developments with the Orillia System for standby service.

On account of the rapid increase of the load in the System it became necessary, early in 1917, to proceed with the extension of the Big Chute generating station; a second steel penstock was purchased; a double runner turbine of

[illegible]

[illegible]

[illegible]

2,300 horse-power capacity and two gate valves were installed, and a 1,600 KV-A. horizontal generator was finally put into commercial service January 28th, 1919.

At October 31st, 1921, seventeen municipalities and three other customers, as shown by the following list, were supplied with power:

Alliston	Elmvale
Barrie	Midland
Beeton	Penetanguishene
Bradford	Port McNicoll
Coldwater	Stayner
Collingwood	Thornton
Cookstown	Victoria Harbour
Creemore	Waubaushene

Canadian Pacific Railway (Elevator)
Camp Borden (Canadian Air Board)
Department of Railways and Canals.

The combined population of the municipalities served by the Severn System on October 31st, 1921 was about 33,000. The proportion of consumers to the population of these municipalities was 20.9 per cent. The power load of the System increased from 220 horse-power in 1911 to 5698 in 1921.

Expenditures of the Commission in respect of the System.

On October 1st, 1912, Mr. H. G. Acres, Hydraulic Engineer of the Commission, had reported to Sir Adam Beck giving a detailed valuation of the system of the Simcoe Railway and Power Company, and naming the sum of $400,000 as an outside purchase price, but this figure apparently

did not include the undeveloped power site at Port Severn which was owned in fee simple by the company. The actual cost of the properties, apparently including the Port Severn site, as entered in the records of the Commission at June, 1914, was $475,355.01.

In order that the values of the component parts of the properties purchased might conform to the total purchase price on the records of the Commission a re-valuation was made by the Engineers of the Commission and the values of the several assets placed as follows:

Big Chute Generating Station -		
Station and Equipment	$202,760.00	
Step-up Equipment	22,953.00	
Intangibles	124,011.00	$349,724.00
Victoria Harbour Tap to Victoria Harbour		3,000.00
Victoria Harbour Distributing Station		2,850.00
Line Big Chute to Waubaushene, including towers		63,506.00
Line Waubaushene to Victoria Harbour Tap		10,330.00
Line Victoria Harbour Tap to Port McNicoll Tap		11,385.00
Port McNicoll Tap to Midland		8,250.00
Midland Station		21,355.00
Victoria Harbour Distribution System		5,150.00
		$ 475,550.00

The item of intangibles shown above apparently includes the Port Severn site, the leasehold rights at Big Chute and the unexpired power contracts and franchises then held by the company.

Power contracts of the Simcoe Railway and Power Company with the Village of Victoria Harbour, the Victoria Harbour Lumber Company, the town of Orillia and the Marconi Telegraph Company of Canada were assumed by the Commission.

Since the acquisition of the above named properties, the Commission has installed an additional unit in the Big Chute generating plant, extended the transmission lines and added other equipment so that at October 31st, 1922, the investment in plant, equipment, etc., of the Severn System amounted to $1,442,301.90, made up as follows:

Power Development	$654,286.51
Transmission Lines	566,276.93
Distribution Stations	211,549.91
Rural Lines	10,188.55
	$1,442,301.90

The expenditure in connection with the installation of an additional unit at the Big Chute generating station amounted to $272,385.00; upon the construction of a wood pole line to serve Alliston, Cookstown, Beeton, Tottenham and Bradford, $118,944.00, and upon distributing stations to October 31, 1921, at Collingwood, Port McNicoll, Midland and Bradford, $22,451, $12,153, $12,637 and $11,174, respectively.

The apportioned capital cost per rated horse-power developed for the years 1914 to 1922, inclusive, is shown in the following table:

Power measures of the Simcoe Railway and Power Company were the figures of Thereby Burbon, the District Railway Lumber Company, the Bank of Utility and the Barnard Chainsaw Company of Canada were assumed by the Commission.

Since the majorities of the above named properties, the commission has instituted an examination into the affairs of the Simcoe Power Company, which, embodied the transmission lines and other entry requirement on that at Vernier Bay, 1922, the income statement in years, dividends, e.t.c., of the corporation showed by $1,440,301.90, made up as follows:

Power transmission	$[illegible]
Transmission rights	301,273.30
Distribution rights	121,847.21
Etc.	10,189.69
	$1,[illegible]

The commission is absolution with the installation of an electrical unit at the old Vernier generating station amounting to $[illegible], upon the construction of a wood pole line to serve district, Dunlaing, Ingra, Cyberton and Stanton, $[illegible], and upon distributing stations in towns at, [illegible], at Wellington, Port Burbell, Hanlon and Stradford, $[illegible], $[illegible], $[illegible] and $[illegible], respectively.

The supplemental capital cost for rates hereinbefore approved for the power line at Elm, Ontario, is stated in the following table:

	Fiscal Year ending October 31st.				
	1914	1915	1916	1917	1918
Power Development	$120.50	$120.50	$120.60	$124.60	$190.30
Transmission Lines	104.40	109.10	115.70	140.80	181.70
Transforming & Distributing Stations	13.80	23.70	27.50	34.00.	57.60
Rural Lines	-	-	-	-	-
	$238.70	$253.30	$263.80	$299.40	$429.60

	Fiscal Year ending October 31st			
	1919	1920	1921	1922
Power Development	$137.80	$141.10	$141.80	$142.23
Transmission Lines	119.00	120.20	123.90	123.10
Transforming & Distributing Stations	36.60	39.00	40.10	45.99
Rural Lines	-	-	.10	2.22
	$293.40	$300.30	$305.90	$313.54

The large rise in the unit costs in 1918 was due to large capital expenditures being made in that year from which no additional power was made available until 1919, when the new unit at Big Chute came into service with a consequent drop in unit costs.

Total Revenues

The following table gives the Commission's revenue from the System for the years 1918 to 1922, inclusive, together with the revenue resulting from the reduction in the renewal reserve which is discussed hereinafter:

Particulars	Year ending October 31st				
	1918	1919	1920	1921	1922
Revenue from -					
Municipalities	$108,980	$171,324	$165,947	$183,913	$156,587
Private companies	38,853	32,068	25,346	28,218	40,698
Together	$147,833	$203,392	$191,293	$212,131	$197,285
Less- Reduction arising in connection with adjustment of Renewal Reserve	10,461	15,443	17,113	16,949	none
Adjusted Revenue	$137,372	$187,949	$174,180	$195,182	$197,285

The profits arising from the sale of power to private companies after giving effect to the adjustment of the Renewal Reserve, from the commencement of operations to October 31st, 1922, amounted to $78,514, of which $57,916 was credited to the municipalities as a reduction in the cost of power to them in proportion to the amounts of maintenance costs of the System paid by them. The balance of $20,598 has been transferred to the Contingency Reserve.

Total Cost of Power

The cost of power, subdivided under various headings, for the years 1918 to 1922, inclusive, as shown by the accounts of the Commission and the adjusted costs after taking into account the adjustment in the Renewal Reserve, appears

Municipalities	Year ending December 31st				
	1922	1923	1924	1925	1926
Revenue from -					
Municipalities	$104,380	$141,414	$149,347	$150,415	$149,204
Private consumers	32,984	11,898	10,944	12,247	10,898
Total	$137,364	$153,312	$160,291	$162,662	$160,102
Expenses -					
Municipalities paying in accordance with maximum of 1922 Energy	12,221	12,842	17,242	12,347	none
Net revenue	$124,143	$140,470	$142,049	$150,315	$160,102

The profits arising from the sale of power to private consumers after allowing to the adjustment of the Hydro-Electric Commission, from the commencement of operations to October 31st, 1926, amounted to $78,416, of which $27,414 was credited to the municipalities on a reduction in the cost of power to them in proportion to the amounts of maintenance costs of the System paid by them. The balance of $50,802 has been transferred to the Contingency Reserve.

Total Cost of Power

The cost of power, subdivided under various headings, for the years 1922 to 1926, inclusive, is given by the accounts of the Commission and the Municipalities paying maximum rates for power. The minimum in the annual results arise mainly from

is the following table:

Particulars	Year ending October 31st 1918	1919	1920	1921	1922
Operating Expenses and Fixed Charges					
Power Purchased	$43,667	$ 42,470	$ 12,853	$18,782	$13,847
Operating Expenses	11,390	15,498	15,468	20,068)	
Maintenance Expenses	19,405	22,674	18,178	25,264)-67,110	
Overhead Expenses	7,812	18,604	26,294	25,887)	
Interest	35,746	55,041	62,755	62,715	62,509
Provision for Renewals	24,576	34,930	37,883	37,906	20,054
Provision for Sinking Fund	3,759	12,717	16,439	19,046	21,254
Provision for Contingencies	1,478	1,458	1,423	1,360	6,312
Total costs	$147,833	$203,392	$191,293	$211,029	$191,086
Less - Reduction arising in connection with adjustment of Renewal Reserve	12,511	17,783	19,286	19,298	none
Adjusted Costs	$135,322	$185,609	$172,007	$191,731	$191,086
Balance Transferred to Contingencies	$2,050	$2,340	$2,173	$3,451	$6,199

Costs per Horse-power

The following table showing the detailed costs per horse-power billed, illustrates in what respects and to what extents the operating costs and fixed charges have increased, as well as the costs before and after the reduction in the Renewal Reserve:

In the following table

Particulars	Year ended 31st March				
	1934	1935	1936	1937	1938
Operating Expenses and Flight Income					
Power Purchased	14,227	14,475	12,404	14,723	14,227
Operating Expenses	12,300	14,489	16,606	20,666	
Maintenance Expense	12,606	22,674	19,375	22,122	47,114
Rational Expense	7,414	10,004	26,446	22,227	
Interest	28,760	28,042	22,768	22,718	22,209
Provision for Contingencies	24,274	24,978	27,382	27,292	29,174
Provision for Renewing Road	3,700	12,717	16,400	18,044	12,224
Provision for Depreciation	1,475	1,428	1,427	1,300	1,224
Total costs	114,7,400	1104,228	1141,120,415	1141,400	1141,000
Gain - Depreciation relating to assets also with adjustment of General Reserve	12,111	17,178	12,400	12,177	[illegible]
Leasing Costs	1144,200	1122,400	1141,047(141)	1141	1141,400
Balance Transferred to Profit-and-Loss	4,664	4,300	4,171	4,400	4,172

Gain on Depreciation

The following table showing the actual cost per horse-power billed, illustrates in what respects and to what extent the supporting costs and flight charges have increased, as well as the costs factors and other the y-effects in the General Reserve

Particulars	Fiscal Year ending October 31st				
	1918	1919	1920	1921	1922
Power Purchased	$7.47	$7.32	$2.26	$3.45	$2.19
Operating	1.92	2.66	2.72	3.68)	
Maintenance	3.23	3.52	3.11	4.54)-10.63	
Overhead & General Expense	1.36	3.45	4.70	4.86)	
Interest	6.04	9.44	11.01	11.52	9.90
Renewals	4.15	5.99	6.66	6.98	5.18
Sinking Fund	.63	2.18	2.89	3.50	3.37
Contingencies	.24	.25	.25	.25	1.00
Total	$25.04	$34.91	$33.60	$38.78	$30.27
Less - Reduction in Renewal provision	2.12	3.05	3.39	3.55	none
Adjusted Costs	$22.92	$31.86	$30.21	$35.23	$30.27
Horse-power billed	5910.5	5821.4	5692.7	5440.8	6311.6

The variations shown in the table are due to some extent to the decreased quantity of power purchased from other systems and the increased amount generated at the Big Chute generating station. The increase in sinking fund is attributable to the additional number of municipalities paying sinking fund, the first five years under their contracts for which payments were deferred, having expired.

Power Purchased from other Systems.

The Severn System in order to meet its requirements purchased power from two of the other systems of the Commission - Wasdell's and Eugenia. The quantities of horse-power of electrical energy delivered by the Eugenia and the Wasdell's Systems to the Severn System, together with the power generated by the latter, are as follows:

Particulars	Actual Face Value Outstanding Debt			
	1919	1918	1917	1916
Paper Currency	[illegible]	[illegible]	[illegible]	[illegible]
Copper	[illegible]	[illegible]	[illegible]	[illegible]
Bullion	[illegible]	[illegible]	[illegible]	[illegible]
Treasury & Savings Bonds	[illegible]	[illegible]	[illegible]	[illegible]
Interest	[illegible]	[illegible]	[illegible]	[illegible]
Commerce	[illegible]	[illegible]	[illegible]	[illegible]
Sterling Fund	[illegible]	[illegible]	[illegible]	[illegible]
Miscellaneous	[illegible]	[illegible]	[illegible]	[illegible]
Total	[illegible]	[illegible]	[illegible]	[illegible]
Less - Deducting in Treasurer's Hands	[illegible]	[illegible]	[illegible]	[illegible]
Net Debt	[illegible]	[illegible]	[illegible]	[illegible]
Gross-Debt Ratio	[illegible]	[illegible]	[illegible]	[illegible]

The variations shown in the table are due to some extent to the decreased quantity of paper produced from other sources and the increased amount generated in the air-cooled electric furnace. The increase in sinking fund is attributable to the additional amount of municipalities paying annuities, the fact that more under their contracts the price payments were deferred, during months.

Paper Produced from other Sources.

The Lorena System is worth in part the preliminary prepared during the year as the other systems of the Commission's and Operation. The quantities of Nitro-Paper of material amount delivered by the Imperial and the Canadian's System to the Lorena System, together with the power generated by the Jackson, are as follows:

Particulars	Year ending October 31st 1918	1919	1920	1921
Received from -				
Eugenia System	x1381.7	x1078.5	17.0	46.0
Wasdell's "	365.0	620.4	496.7	426.6
Generated by Severn"	4163.9	4122.5	5179.0	4968.2
Total Average Horse-power	5910.6	5821.4	5692.7	5440.8
(x) With line loss deducted the horse-power will be	1337	1047		

The total amount paid for power by the Severn System to Eugenia and Wasdell's Systems, for the years 1918 to 1921 inclusive, was $2,657 (cents omitted) less than the total cost (including fixed charges) of such power to the Eugenia and Wasdell's Systems. For the period to October 31st, 1917, the amount paid by the Severn System to Eugenia and Wasdell's Systems exceeded by $17,434 (cents omitted) the cost to the supplying systems. The net combined profit to Eugenia and Wasdell's Systems, or the amount paid for power by Severn System to the other systems in excess of the cost thereof to these other systems, from the time power was first purchased by the Severn System from them to October 31st, 1921, was $14,777, of which $12,171 and $2,606 were received by the Eugenia and Wasdell's Systems respectively. The profits shown above are subject to a slight increase owing to the fact that the reduction in the Renewal Reserve has not been given effect to therein.

Participants	Year ending Sept. 30 1916	1917	1918	1919
Receipts from -				
Mugwala System	[illegible]	[illegible]	[illegible]	[illegible]
Baadali's "	[illegible]	[illegible]	[illegible]	[illegible]
Contributions by Irrigators	[illegible]	[illegible]	[illegible]	[illegible]
Total Irrigation Revenue-Power	[illegible]	[illegible]	[illegible]	[illegible]

(a) With line improved the Power will be 1847 1047

The total annual paid for power by the Irrigation Department and Baadali's Pirzada, for the years 1916 to 1921 inclusive, was [illegible] lacs (original lacs from the total was including first [illegible]) in each year to the Mugwala and Baadali's Pirzada. For the period to October 31st, 1917, the amount paid by the Irrigation Department to Mugwala and Baadali's Pirzada amounted to [illegible] lacs (original) the work in the supplying station. The net annual profit to Mugwala and Baadali's Pirzada, or the amount paid over power by Irrigation to the water systems in excess of the net interest on these other systems, from the time power was first generated by the Kangra Hydro from then to October 31st, 1919, was [illegible], of which [illegible] and [illegible] were received by Mugwala and Baadali's Pirzada respectively. The profits shown above are negligible in a single investment using as the fact that the variations in the interest therefore the only loss direct effect to Mugwala.

The effect of one system of the Commission receiving a profit from power delivered to another system would appear to be that the receiving system in such case pays more than the actual cost of the power received, and the system which delivers the power has its cost of power reduced by the amount of the profit made by the sale. On the other hand, where one system incurs a loss from power delivered to another system, the receiving system pays less than the actual cost and the customers on that system profit to the detriment of customers on the delivering system. The situation created in either case conflicts with the basic principle of the Power Commission Act, namely, that power shall be delivered to municipal corporations at the actual cost thereof to the Commission.

On the interchange of power between Eugenia, Kazdeli's and Severn Systems prior to 1921, the Commission charged the receiving system a flat rate of $25.00 per horse-power which in some years exceeded and in other years was less than the actual cost to the supplying system. Subsequently, actual costs were charged and the only question open is whether or not such actual costs should include sinking fund payments on the generating plant of the supplying system, and if so, does the receiving system acquire any interest in such generating plant.

Reserve for Renewals.

The reserve for renewals has been provided by inclusion in the cost of power of an annual charge of 2.75% of that portion of the capital investment applicable to those

properties of the System for which, in the stated opinion of the Engineers of the Commission, provision for depreciation was necessary, together with interest at the rate of four per cent. per annum on balances in the reserve account.

In December, 1922, the Commission decided "that the depreciation rate for the Severn System should be fixed at 1.35 per cent. and that this rate be made retroactive to the date of first operation." The effect of this revision has been to reduce the renewal reserve of $227,347 at October 31st, 1921, by the sum of $119,976, of which $105,308 has been applied as a credit to the municipalities and $14,668 as an addition to the contingency reserve. The balance in the reserve after giving effect to the above reduction amounted to approximately $107,371 at October 31st, 1921, and this sum has been increased to $132,743 as of the close of the fiscal year 1922.

As before indicated this reduction has the effect of decreasing the cost of power, for each year in which provision was made for renewal reserve, to all municipal corporations supplied with power by the Commission during such year, and pro tanto relieves of liability for unpaid balances those municipal corporations, which have not paid to the Commission the full amount of the power bills rendered to them, and, if other unit costs do not increase, will reduce the future annual price of power to all municipal corporations on the system.

While our Consulting Engineer has reported to us that the reserve for renewals as at October 31st, 1921, before effect was given to the revision made in December, 1922, was in his opinion somewhat higher than was necessary, he has not yet reported upon the amount of the reduction made. The general subject of "Reserve for Renewals" will be further dealt with in our General Report.

Reserve for Sinking Fund.

The amount to the credit of sinking fund on October 31st, 1922, was for the Severn System, $83,613.38, representing the amount collected or collectible to that date from eleven municipal corporations which had received power for six years or longer, and one rural power district which began to take power during 1922. The reserve for sinking fund is being provided for in the cost of power in accordance with the Power Commission Act to form in thirty years, with interest at 4 per cent. per annum, the amount of capital investment. Under authority of Section 23 of the Power Commission Act, sixteen municipal corporations on the System were relieved by the Commission from payment of any sum on account of the sinking fund account for the first five years. Payments, therefore, on account of sinking fund which, if not deferred, would have been payable in the first year in which the municipal corporation received power, did not accrue due until the sixth year of operation; those payable in the second year accruing due in the seventh, and so forth. Of the eighteen municipal corporations on the

While our General Manager has reported to you that the reserve for Kamaniskeg as at October 31st, 1932, varies between six days in the winter months to December, 1932, and in his opinion somewhat higher than our experience, he has not yet reported upon the amount of the reservoir needed. The General Manager is "doubtful for Kamaniskeg will be the same as with Lake in our General report.

Reserve for Winter Peak.

The answer to the crucial of winter peak on October 31st, 1932, was for the Ferris System, 120,414.49, supplemented by hydro-electric or utilization is that upon from steam. Municipal supply which had received power for six years or longer, and the total power distributed which equal to some power during 1932. The reserve for winter peak is being provided for in the cost of power in accordance with the Power Commission let to them in twenty years, with interest at 6 per cent per annum, the answer is capital investment.

Further on at the Power Commission let, steam supplied hydro-electric on the direct sale relative to the Commission from payment of any one in answer of the winter peak for August the first five years. Kapuskasing, Iroquois, as mentioned at winter from water, if not deferred, would cost some payment in the first year in which the municipal corporation received power, its not answer the will the start year if continued been paying in the second year matters are to the network, and to date. If the minimum municipal corporations on the

system as at October 31st, 1922, two, Penetanguishene and the rural power district, had paid all charges against them, and six had made no payments on sinking fund account as the deferment period in their cases had not elapsed.

Prior to 1915, the Act gave no power to defer payments. An amendment made in 1916 authorized the Commission with the approval of the Lieutenant-Governor in Council, to relieve from payments during the first five years of a contract, but the whole amount of the necessary payments were to be made during the remainder of the term of the contract. The amendment of 1916 was repealed in 1917 and the present provision for deferment of payments enacted, - the approval of the Lieutenant-Governor-in-Council being dispensed with.

Reserve for Contingencies.

The Power Commission Act authorizes the Commission to establish a reserve for unforeseen expenditures for the purpose of providing for special losses or expenses not arising at regular intervals and not wholly applicable to the period in which incurred. The amount to the credit of this reserve for contingencies on the Severn System on October 31st, 1921, as shown by the books of account of the Commission when examined by our Accountants, was $7,128.00. Mr. Francis, in his report to us before referred to, states that having in mind the heavy losses which might be incurred through catastrophe,

he is of opinion that the reserve for contingencies should be augmented by increasing the annual allowance until the fund amounts to $20,000 or $30,000, when a readjustment might be made to meet conditions. The reduction made by the Commission in December, 1922, in the reserve for renewals and the crediting of $14,658.00 of such reduction to the reserve for contingencies increased this latter fund as of October 31st, 1921, to $21,796.00, approximately the amount recommended to us by Mr. Francis. The balance was further augmented during the fiscal year 1922, and at October 31st, 1922, amounted to $29,220.00.

Accounts with Municipal Corporations.

These are of two classes:

(a) Power Accounts Receivable.

(b) Due by or to municipal corporations on annual adjustment by the Commission of power costs for the year.

(a) The balances of power accounts receivable at October 31st, 1921, amounting to $43,621.00, were all paid at September 20th, 1922, except three amounts aggregating $809.09, as follows:

Municipal corporation	Amount	Period Covered.
Beeton	$325.03	October 1921 Balance
Bradford	333.90	January to April, 1920.
Thornton	150.16	January to April, 1920.
Total as above	$809.09	

On is of opinion that the powers for depreciation should be computed by increasing the annual allowance equal the fixed amounts in 1920 or 1921, when a readjustment might be made in such conditions. The revenues paid up the municipality in February, 1924, in the reserve for renewal, and the building of $14,486.00 of such revenues in the reserve for contingencies increased this latter item as of January, 1924, to $23,272.00, approximately the amount required to be by Dr. Pressly. The balance was transferred accounting during the fiscal year 1923, and as October 31st, 1923, amounts to $22,420.07.

Financial data of the Commission.

There are of the sinkers:

(a) Short Lessons Sinking.

(b) Due on or to municipal corporations on annual adjustments by the Commission of yearly dues for the year.

(c) The balance of power accounts receivable as February 31st, 1924, amounting to $14,151.00, were all paid as January 31st, 1924, except very small amounts outstanding $400.00, on January.

Municipal corporations	Amount	Paid on January
Bayham	$240.00	January 1st, 1924.
Burford	210.00	January 31 April, 1924.
Thorah	150.00	January 31 April, 1924.
Total as above	$400.00	

(b) At the close of each fiscal year the interim power bills are adjusted to meet the total cost of power for that year.

On October 31st, 1921, there was a debit balance amounting to $56,175.48 against thirteen of the municipal corporations on the system and four municipal corporations had credit balances totalling $2,705.54.

The change in these amounts during the fiscal year ending October 31st, 1922, may be briefly summarized as follows:

Balance, October 31st, 1921		$53,469.94
Add - Charges:		
Cash refunded to municipalities by the Commission.....		2,705.54
Interest charged on debit balances		645.80
Excess of the cost of power over amounts paid by the municipalities during the fiscal year 1922		624.64
Total		$57,447.92
Deduct: Credits:-		
Amount credited to municipalities upon adjustment of renewal reserve.....	$105,387.79	
Cash payments.....	14,009.89	
Interest allowed on credit balances.....	2,754.84	
Excess of the amounts paid by municipalities over the cost of power supplied to them during the fiscal year, 1922.....	31,900.20	153,972.72
Balance owing to the municipalities at October 31st, 1922		$96,524.80.

(b) At the close of each fiscal year the income after that the municipality or may the total sum of bills for that year.

On October 31st, 1921, there was a debit balance amounting to $28,372.61 against Salaries of the municipal corporations on the system and four municipal corporations due credit balances totalling $2,708.64.

The change in these accounts during the fiscal year ending October 31st, 1921, may be briefly summarized as follows:

Balance, October 31st, 1921	$30,388.94
COPY	
Less - Transfer:	
Over returned to municipalities for the treasurer.....	2,708.64
Interest charges on daily balances	121.67
Excess of the cost of power over amounts paid by the municipalities during the fiscal year 1921	1,111.11
Total	$27,447.92

Balance Consisting:-

Amount credited to municipalities upon settlement at account receivable.....	$25,307.17
Take expense.....	34,209.23
Interest allowed on	
Accounts payable.....	2,131.52
Excess of the revenue yield over the cost of power supplied to the municipalities over the total sum of bills for the fiscal year, 1921.....	34,209.23 - 25,307.17
Balance owing to the municipalities as at October 31st, 1921	$28,388.90

In arriving at the balance of $96,524.60, it was ascertained that there was at October 31st, 1922, debit balances of $14,620.23 against five of the municipal corporations on the system and thirteen had credit balances aggregating $111,145.03.

Results of Operation.

(a) Estimated power loads compared with actual power loads to October 31st, 1921.

This comparison is shown in the following table:

Municipality	Date Power was First Taken	Yearly Minimum Load H.P.	Yearly Maximum Load H.P.	Yearly Average Load H.P.	Estimated Load Required #
Alliston	1918	96.5	133.5	120.6	250
Barrie	1913	309.1	788.5	502.2	500
Beeton	1918	87.5	91.4	89.6	125
Bradford	1918	28.9	53.0	41.0	No Estimate
Coldwater	1913	31.1	67.9	43.3	200-300
Collingwood	1913	302.6	1831.5	1017.1	700
Cookstown	1910	52.7	61.1	57.1	75
Creemore	1915	42. 0	46.2	45.3	75
Elmvale	1913	31.4	150.8	90.3	150
Midland	1912	300.3	1376.2	844.1	No Estimate
Penetanguishene	1912	233.0	759.5	503.4	400
Port McNicoll	1915	20.0	37.7	26.4	25
Stayner	1913	51.0	120.0	85.2	150
Tottenham	1918	28.4	35.2	31.4	100
Victoria Harbor	1914	27.3	46.9	34.8	50
Waubaushene	1915	18.3	24.8	21.2	50
Thornton	1919	11.0	12.3	11.7	25

(#) In the case of some of the municipalities more than one estimate of load required was given for the purpose of determining an estimated cost of power in the event of the minimum estimate of load being exceeded.

In arriving at the balance of £14,[illegible], it was ascertained that there was at October 31st, 1921, cash amounting to £14,[illegible] against this at the commencing year-ending on the 31st December and yearly balance corresponding £13,160.00.

Degree of Operation.

(a) Internal power issue economy with animal power issue to October 31st, 1921.

This comparison is shown in the following table:

Implement.	Job power Min.	Job power Max.	Yearly Minimum Hours.	Yearly Maximum Hours.	Yearly Average Hours.	Yearly Hours Saving %
Ploughs	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Harrows	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Rollers	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Drills	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cultivator	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cultivator	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cultivator	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Horse Hoe	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cranes	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Binder	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Stacks	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Threshing	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cutter	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Tractor	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Tractor	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Tractor	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Tractor	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Tractor	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

(*) In the case of some of the machines more than one machine of land varying was taken for the purpose of determining on actual cost of power in the study of the relative economics of less being achieved.

(b) Estimated Cost per horse-power compared with actual cost per horse-power.

The following is a table of the estimates as submitted to the municipalities in the Severn System by the Commission as compared with the actual costs of power supplied during the full year periods of operation. The figures of the yearly actual cost per horse-power appearing in this table were deduced after examination of the accounts of the Commission to October 31st, 1921, and are subject to revision because of the retroactive reduction made in December, 1922, in the renewal reserve.

Municipality	Yearly Minimum Actual Cost per H.P.	Yearly Maximum Actual Cost per H.P.	Yearly Average Actual Cost per H.P.	Estimated Cost prepared by Commission
Alliston	$64.95	$72.02	$.67.64	$ 35.00
Barrie	21.14	37.75	29.15	40.15
Beeton	76.34	82.24	79.07	44.27
Bradford	112.59	168.11	130.59	None
Coldwater	28.22	51.46	40.49	30.58
Collingwood	21.08	49.83	30.13	33.97
Cookstown	50.83	57.03	54.82	34.00
Creemore	53.18	75.13	65.61	54.13
Elmvale	24.18	49.05	32.60	31.00
Midland	17.50	30.01	23.72	None
Penetanguishene	17.57	31.39	26.12	19.00
Port McNicoll	39.11	60.39	47.94	34.00
Stayner	27.58	51.32	38.35	35.74
Thornton	105.90	116.25	111.34	48.00
Tottenham	114.73	121.91	117.72	50.45
Victoria Harbor	41.42	60.74	46.44	40.16
Waubaushene	.19.02	53.18	35.60	29.75

(b) Estimated cost per horse-power compared with actual cost per horse-power.

The following is a table of the estimates as submitted to the municipalities in the Dominion Parks by the commission as compared with the actual costs of power supplied during the full year periods of operation. The figures of the yearly actual cost per horse-power appearing in this table were obtained after examination of the accounts of the municipalities for the year ending 31st December, 1921, and are usually in particular cases at the anniversary-month-end in December, 1921, in the general average.

Municipality	Yearly actual cost per H.P.	Yearly average actual daily per H.P.	Estimated daily per horse-power by Commission
Antigonish	[illegible]	[illegible]	[illegible]
Barrie	[illegible]	[illegible]	[illegible]
Brandon	[illegible]	[illegible]	[illegible]
Brantford	[illegible]	[illegible]	[illegible]
Chatham	[illegible]	[illegible]	[illegible]
Chilliwack	[illegible]	[illegible]	[illegible]
Cobourg	[illegible]	[illegible]	[illegible]
Dauphin	[illegible]	[illegible]	[illegible]
Dryden	[illegible]	[illegible]	[illegible]
Elmira	[illegible]	[illegible]	[illegible]
Glenboro	[illegible]	[illegible]	[illegible]
Fredericton	[illegible]	[illegible]	[illegible]
Jasper-Edmonton	[illegible]	[illegible]	[illegible]
Kingston	[illegible]	[illegible]	[illegible]
Thorold	[illegible]	[illegible]	[illegible]
Tottenham	[illegible]	[illegible]	[illegible]
Tiverton Survey	[illegible]	[illegible]	[illegible]
Yorkton	[illegible]	[illegible]	[illegible]

To some of the above municipalities estimates were furnished on bases of different power loads which might be taken and to others different estimates were given at different times for the same load. In the above table the "Estimated Cost Prepared by Commission" in both cases is the one which corresponds most closely to the conditions that have prevailed since the estimates were made. The above table shows that the actual cost exceeds the estimated cost for a majority of the municipalities. It is to be remembered, however, that for some years after commencement of operations there are circumstances which may militate against the actual cost being as low as the estimated cost and the report of the Commission for 1922, which has been issued since the preparation of the above table, shows an increase of load and a decrease of actual cost. With favorable conditions the actual cost may in time more nearly approximate the estimated cost.

As previously pointed out, the costs shown in the above table are subject to reduction in respect of renewal charges and the effect of this reduction may be noted from the following table which shows the cost of power to each municipality for the fiscal year ending October 31st, 1921, before and after giving effect to the reduction in renewal charges. The costs per horse-power are also given for the fiscal year ending October 31st, 1922, which are on the basis

In some of the above municipalities estimates were furnished on basis of different power loads which might be large and to which different rates would apply at different times for the same load. In the above table the "Actual Cost Compared to Estimated" is arrived at on the rate which Commission may consider most equitable in the additions that have prevailed since the estimates were made. The error table shows that the actual cost exceeds the estimated cost for a majority of the municipalities. It is to be remembered, however, that the same power after transformed by operating there are circumstances which may minimize the actual cost when compared to the estimated cost and the report of the Commission for 1921, which has been during that the preparation of the above table, shows an increase of less -- decrease of actual cost. The favorable conditions the actual cost may in time more nearly approximate the estimated cost.

As previously stated, the rate shown in the same table was adopted by resolution in August of the following year and the effect of this reduction may be noted from the following table which shows the rate at power is now maintained by for the fiscal year ending October 31st, 1927, before and after giving effect to the reduction in annual charges. The rate per kw. dependent was also given for the fiscal year ending October 31st, 1927, which are on the basis

of a renewal charge of 1.35%.

Municipality	1921 Costs per H.P. Before Renewals Reduction	1921 Costs per H.P. After Renewals Reduction	1922 Costs per H.P.
Alliston	$ 67.13	$ 58.95	$53.99
Barrie	34.59	31.61	27.60
Beeton	82.24	72.12	65.03
Bradford	112.59	98.94	82.22
Coldwater	44.93	42.16	30.28
Collingwood	49.83	45.66	34.91
Cookstown	57.03	50.87	45.35
Creemore	75.13	67.68	56.44
Elmvale	38.15	35.12	29.32
Midland	30.01	27.32	24.78
Penetanguishene	31.39	28.61	25.99
Port McNicoll	39.11	36.03	28.96
Stayner	48.25	42.24	36.32
Thornton	116.25	103.28	78.33
Tottenham	1[illegible].93	102.64	88.52
Victoria Harbor	4[illegible].85	41.77	39.62
Waubaushene	53.18	49.05	37.62

Rural Lines

At October 31st, 1921, the expenditures on rural power district construction amounted to $53.42. Between that date and August 31st, 1922, the latest date of closing the accounts available, these expenditures had increased to $14,486.55, and are in respect of 5.25 miles of primary lines with necessary secondary lines for consumers on Hurontario Road, south from Collingwood. The line was put into operation on January 24th, 1922, and on September 30th was serving

58 customers, which number, we are informed, it was expected would be increased to 60 on November 1st.

Proposed Extension of the System.

Extensions in connection with the development and transmission of power in the System have been undertaken, and we are informed that others are contemplated by the Commission. The Provincial estimates for 1922 and 1923 include appropriations voted for the Severn System in order to complete during the years 1922 and 1923, work then in progress and for additional works, betterments and extensions to be undertaken during these years, as follows:

Particulars	Year ending October 31st 1922	1923
Port Severn Power Development	$25,000	
Port Severn Power Development (The power capacity of the Severn System is insufficient for the load demand and additional development is necessary)		$250,000
Miscellaneous Lines and Stations (Improvements and probable extensions to capacity of Barrie and Midland stations, also minor betterments)	50,000	50,000
Rural - (Extensions in existing, and establishing of new rural districts)	50,000	50,000
Totals	$125,000	$350,000

Of Ontario, which answer, on the latter, it was economically worth an investment of $3 on Ontario Law.

Commercial Development of the System.

Development in connection with the development and transmission of power in the System have been unsatisfactory, but as the information here given are authenticated by the investigation. The provincial estimates for 1922 and 1923 include appropriations voted for the Trent Canal in order to provide funds for the power that was lost, some has to be replaced and for additional water, but expenditure is to continue, which under 1923, of $1,000,000

Particulars	Year ending October 31st 1922	Year ending October 31st 1923
Trent Canal Power Development for Power Development (The power capacity of the Trent System is increased for the land general and electrical requirements is expected)	$19,000	$300,000
Distribution mains and connections (Improvements and provide connections to capacity of Barrie and Midland systems, and minor extensions)	20,000	20,000
Total - Increase in capital, and expenditure at the rate (Estimate)	39,000	39,000
Total	$19,000	$320,000

Our Accountants advise that during the period from October 31st, 1921 to October 31st, 1922, the net capital expenditure amounted approximately to $36,000.

Conclusion

We desire to emphasize what appears to be an outstanding feature of this as of other undertakings of the Commission, namely, that estimates prepared by the Engineers of the Commission and submitted to municipalities contemplating entering into contracts with the Commission are almost invariably higher in respect of power loads required and lower as to the cost of power than are respectively the actual power consumed and the actual price charged after contracts have been made.

The expenditures made by the Commission in purchase of the properties of the Simcoe Railway & Power Company and upon extension of the Big Chute plant and for transmission lines do not appear to have been provided for by appropriations specifically made therefor or in general appropriations applicable thereto, and were presumably made from the "general fund" of the Commission and moneys therein derived from sources and for purposes unconnected with the Severn System. The diversion of funds in the hands of the Commission for one purpose, from that to another is, in

our opinion, not only unwise, but also improper and unwarranted.

All of which is respectfully submitted.

DATED AT TORONTO, Sept. 7th 1923

W. D. Gregory, Chairma
M. J. Haney
Lloyd Harris
J. Allan Ross
R. A. Ross

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